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ABSTRACT

Ways of utilizing behavioral objectives to their best advantage are specified. The purpose of the study is to help educators improve instruction through examination of different approaches to constructing behavioral objectives. Classroom teachers have been convinced that behavioral objectives are "necessary" for the functioning of the "general model of instruction" and that the "general model of instruction" is "necessary" for the improvement of instruction. Five suggestions for properly constructing behavioral objectives are given: (1) making possible the more efficient attainment of the broad general goals of instruction; (2) making it possible for the teacher to use results of learning research in designing instructional experiences; (3) making it possible for the teacher to test hypotheses regarding the effectiveness of different learning experiences for the attainment of the objective; (4) making it possible for teachers to produce findings which can be generalized to facilitate the attainment of similar objectives; and (5) making it possible for the teacher to diagnose and remediate the learning difficulties encountered by students. References are included in the document. (Author/DB)

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THE SUFFICIENCY OF DIFFERENT APPROACHES TO CONSTRUCTING BEHAVIORAL OBJECTIVES FOR THE IMPROVEMENT OF INSTRUCTION

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Behavioral Objectives and the General Model of Instruction

The sufficiency of behavioral objectives when used in the "General Model of Instruction" for bringing about instructional improvement has not been adequately considered. Behavioral objectives have been sold to classroom teachers on the basis that:

1. They are "Necessary" for the functioning of the "General Model of Instruction."
2. The "General Model of Instruction" is "Necessary" for the improvement of instruction.

The larger questions of the "Sufficiency" of the "General Model of Instruction" for improving instruction, and the effect that using different approaches to constructing behavioral objectives has on the functioning of the "Model" needs to be examined.

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Behavioral Objectives are "Necessary" for the GMI to Function

Behavioral objectives originated as part of an attempt to use the procedures of science for the improvement of instruction. Objectives in behavioral form were presented as an essential part of a GMI which in turn was deemed necessary if teachers were to use the procedures of science to bring about the improvement of instruction. The steps in the GMI were:

1. Determine the desired student behaviors.
2. Pre-assess the desired student behaviors to determine the extent to which the students have already acquired the behaviors.

3. Design learning experiences for the attainment of the objectives.
4. Evaluating the effectiveness of the learning experience based on the attainment of the objectives.

The arguments used to promote the use of behavioral objectives seem unassailable. Behavioral objectives are necessary for the improvement of instruction because:

1. You need to know where you are going before you can design a learning experience to take you there.

2. You cannot see learning occur so you must observe changes that occur in the behavior of the learner, and from these infer learning (i.e., he can do something now that he could not do before).

3. Before you can judge the effectiveness of a learning experience you must have some criterion against which to evaluate it.

The General Model of Instruction is "Necessary" for Instructional Improvement

It is difficult to argue that some form of the GMI is not necessary for the improvement of instruction. We need a procedure that will allow us to draw conclusions about the relative effectiveness of different instructional techniques, and no one has yet come up with a procedure that does not entail the same general steps.

The Use of Behavioral Objectives in the "General Model of Instruction" Does Not Necessarily Create "Sufficient" Conditions for the Improvement of Instruction

In advocating the use of behavioral objectives in the GMI we have failed to adequately consider the relationship of the GMI to instructional improvement. We have been advocating the use of behavioral objectives for the improvement of instruction without ever making clear what constitutes the improvement or how the knowledge generated from the use of behavioral objectives in the GMI is to be accumulated and use for improving instruction.

The position taken here is that the improvement of instruction constitutes the effective and efficient attainment of the Broad General Goals of Instruction.

Thus, improvement of instruction is not just the more efficient attainment of the Specific Behavioral Objectives. Failure to do this has left the proponents of behavioral objectives open to the charge that what they are really advocating is the more efficient attainment of trivia.

Those advocating the use of behavioral objectives in the GMI as a means of improving instruction have also not addressed themselves to the question of how the knowledge generated as a result of using behavioral objectives in the "Model" is to be accumulated and used for the improvement of instruction.

Behavioral objectives when incorporated into the GMI have a great potential for improving instruction. They can, if properly constructed and placed in the GMI, lead to the improvement of instruction by:

1. Making possible the more efficient attainment of the broad general goals of instruction.

2. Suggesting appropriate learning experiences for the attainment of the objectives. (i.e., making it possible for the teacher to use the results of learning research in designing instructional experiences).

3. Making it possible for the teacher to test hypotheses regarding the effectiveness of different learning experiences for the attainment of the objective.

4. Making it possible for teachers to produce findings which can be generalized to facilitate the attainment of similar objectives.

5. Making it possible for the teacher to diagnose and remediate the learning difficulties encountered by students.

There are perhaps other possible contributions that behavioral objectives can make to the improvement of instruction once they are placed in the "General Model of Instruction." However, the above appears to provide an adequate background against which to evaluate current approaches to the construction of behavioral objectives.

The Sufficiency of Different Approaches to the Construction of Behavioral Objectives for the Improvement of Instruction

Different approaches to the construction of behavioral objectives have evolved in recent years. The newer approaches to constructing the objectives have evolved around attempts to 1) answer the charges of critics regarding the trivial nature of the behaviors contained in the origional objectives and 2) incorporate traditional measurement procedures into the objectives. More specifically, they have evolved around attempts to do one or more of the following:

1. Incorporate higher level cognitive processes into the objective.
2. Incorporate goal statements into behavioral objectives.
3. Incorporate both goal statements and evaluation procedures into the objectives.
4. Matching student behaviors to the outcomes of learning research.

The advocates of the different approaches to constructing the objectives have continued to infer that the new approaches to writing the objectives have no effect on their use in the GMI. They generally make direct reference to the use of the objectives in the "Model," but make no attempt to relate the use of the objectives in the "Model" to the over-all concept of the "Improvement of Instruction."

The Traditional Behavioral Objective

The traditional approach to the writing of behavioral objectives involves writing the objectives so that when they are placed in the "Model" there is little question regarding how they can be evaluated. The evaluation procedure may or may not be incorporated in the objective itself. The objectives apparently evolved from the area of educational measurement. Tyler (1934) wrote on the importance of writing educational objectives in behavioral form. Objectives

of the type suggested by Mager (1961) seem to correspond to the traditional approach.

Sample Objective: Given a human skeleton, the student must be able to correctly identify by labeling at least 40 of the following bones; there will be no penality for guessing (list of bones inserted here).

Note: Mager emphasises that the objective should:

1. Identify and name the over-all behavioral act.
2. Define the important conditions under which the behavior is to occur.
3. Define the criterion of acceptable performance.

Contribution the Objectives Make to the Improvement of Instruction

1. Contribution the objectives makes toward the attainment of the broad, general goals of instruction.

   The traditional approach to writing the objectives makes no attempt to relate specific behavioral objectives to the broad general goals of instruction. A condition that has led to the charge that behaviors incorporated in the "Model" are necessarily trivial.

2. Suggestion of appropriate learning experiences. Does it make the use of learning research possible?

   The results of learning research can be used to facilitate the efficient attainment of the objectives. Behaviors such as the ones in the objectives are learning outcomes which are attained through the use of the principles of stimulus response learning.

3. Does placing the objective in the "Model" make it possible for the teacher to formulate and test hypotheses regarding the effectiveness of different learning experiences for attaining the objective?

   Behavioral objectives which conform to the criteria suggested by Mager create the "Necessary" conditions for determining that instructional procedure "A" is better than instructional procedure "B" for attaining the objective. With little additional effort such as matching groups, etc., the teacher is in a position to create conditions "Sufficient" for testing hypotheses regarding the effectiveness of different learning experiences for attaining the objective.

4. Does placing the objective in the "Model" make it possible for the teacher to produce findings which can be generalized to facilitate the attainment of the same or similar objectives with different individuals and content?

   A teacher who finds that instructional procedure "A" is significantly better than instructional procedure "B" for getting the students to the point where they can name the bones of a skeleton is in possession of information that only has limited generalizability. The teacher only knows that procedure "A" was more effective than procedure "B" for teaching the two groups of students the objective. He cannot infer that procedure "A" is better than procedure "C", "D", or "E." Similarly, he cannot infer that procedure "A" will be more effective that "B" for teaching other individuals or content.

5. Does the statement of the objective facilitate the diagnosis and remediation of learning difficulties encountered by the students?

   The answer to the above would appear to be "yes." The behaviors specified in the objective are relatively homogeneous in terms of 1) the kind of content and 2) the cognitive process required. Test items used to evaluate the ability of the student to perform the behavior are homogeneous enough so that the teacher is able to tell which content the student has not attained, and which cognitive process (in this case identification) he cannot perform. These two conditions appear to be necessary prerequisites for diagnosing and remediating learner difficulties.

Behavioral Objectives that Incorporate Higher Level Cognitive Processes

The Taxonomy of Educational Objectives: Cognitive Domain (Bloom, 1956) represents the first attempt to incorporate higher level cognitive processes into the objectives. The Taxonomy was an attempt to classify cognitive processes on a cumulative and hierarchical continuum. The simple to complex ordering suggested that the students must have "Knowledge" (the ability to recall) before they can "Comprehend" (recognize content stated in different ways), "Comprehend" before they can "Apply" the content, "Apply" before they can "Synthesize," and "Synthesize" before they can "Evaluate." In addition

to providing a classification system for cognitive processes the Taxonomy authors included sample test items to be used to evaluate the attainment of the objectives.

Sample Objectives:[1]

Knowledge - *The student will have* knowledge of the major principles of high school chemistry. (Page 76)

Comprehension - *The student will have* the ability to interpret various types of social data. (Page 94)

Application - *The student will have* the ability to apply science principles, postulates, theorems, or other abstractions to new situations. (Page 124)

Analysis - *The student will have* the ability to recognize form and pattern in literary or artistic works as a means of understanding their meaning. (Page 148)

Synthesis - *The student will have* the ability to formulate a theory of learning applicable to classroom teaching. (Page 148)

Evaluation - *The student will have* the ability to appraise judgments and values that are involved in the choice of a course of action. (Page 192)

Contributions the Objectives Make to the Improvement of Instruction

1. Contributions the objectives make toward the attainment of the broad general goals of instruction.

It appears that for the Taxonomy authors, the broad general goals of instruction would correspond to the behaviors specified in the higher taxonomy levels. The attainment of the higher level objectives would be facilitated by the systematic attainment of lower level objectives.

Popham and Baker's "Higher than the lowest level" objectives appear more specific than broad general goals of instruction. They list broad general goals of instruction primarily for the purpose of showing that they are not in behavioral form. They make no attempt to show how the additive result of attaining their behavioral objectives would be the attainment of broad general goals of instruction.

[1]The italics are ours.

2. Suggestion of appropriate learning experiences. Does the use of the objectives make the use of learning research possible?

Objectives such as the ones suggested above do not suggest appropriate learning experiences. The problem arises because the classification system used by the Taxonomy authors was an arbitrary one which classified behaviors into categories that have no scientific utility. (i.e., used in any related disciplines). A condition that makes it impossible for teachers to generalize from the results of learning research to the design of learning experiences for the attainment of the objectives.

3. Does placing the objective in the "Model" make it possible for the teacher to formulate and test hypotheses regarding the effectiveness of different learning experiences for attaing the objectives?

Placing behavioral objectives containing higher level cognitive processes such as "Applications," "Analysis," "Synthesis," and "Evaluation" in the GMI does not make it possible for teachers to formulate and test hypotheses regarding the effectiveness of learning experiences for the attainment of the objective. The functioning of the GMI depends on the incorporation of behavioral objectives which are relatively homogeneous in terms of both content and process. A logical analysis of the content and operations required for attaining objectives such as the ones mentioned above reveals a complex structuring of content and operations. The complexity of the behaviors 1) make it impossible for the teacher to design any one learning experience that will lead to the attainment of the complex behavior and 2) require the construction of complex, heterogeneous test items which can be missed as a result of the inability of the student to perform any one of the number of different tasks. Testing hypotheses regarding the effectiveness of learning experiences is impossible under such conditions.

4. Does placing the objective in the "Model" make it possible for the teacher to produce findings which can be generalized to facilitate the attainment of the same or similar objectives with different individuals and content?

If a teacher discovers that learning experience "A" is more effective than learning experience "B" for getting the students to the point where they can apply the principles of mathematics to solve ratio problems can he then infer that procedure "A" will be more effective than "B" for getting the students to the point where they can solve the three kinds of percentage problems or that the procedure will be more effective for getting the students to the application level

in the language arts or social studies? The answer appears to be "No." Similarly, it seems doubtful that he can generalize his results to conclude that learning experience "A" is more effective than learning experience "B" for attaining the same objective with classes of different ability levels.

5. Does the statement of the objective facilitate the diagnosis and remediation of learning difficulties encountered by students?

   The answer to the above seems to be "No." The behaviors specified in objectives involving higher level cognitive processes are complex in terms of both the content and processes. The complexity of the behaviors makes it difficult for the teacher to know why the student missed the higher level items. The items can be missed for such a large number of reasons that the diagnosis of the learning difficulties of individual students is difficult.

Behavioral Objectives that Incorporate Both Terminal and Evaluation Procedures

Some of the more recent approaches to constructing behavioral objectives have suggested that the objectives incorporate both goal statements and evaluation procedures.

Sample Objectives:

1. Learner is to develop an integrated, self-designed concept of the causes and consequences of war so that he can:
   a. Choose any of six major wars and research them to the degree that one can compile a list of causes and consequences for each based on recorded facts or expert opinion.
   b. Summarize one finding and write a conclusion based on the evidence compiled. (Burns, p. 95)
2. To develop in ninth-grade agriculture students a basic knowledge of function, composition, and properties of soil to be measured by a written teacher-made test on which 70% of the students correctly respond to 15 out of 28 questions. (McAshen, p. 41)

Contribution the Objective Makes to the Improvement of Instruction

1. Contribution the objective makes toward the attainment of the broad, general goals of instruction.

Placing goal statements in the objective does nothing to insure that the attainment of the specific behaviors will lead to the attainment of the goal. The specific behaviors merely indicate that some of the behaviors related to attainment of the terminal outcome have or have not been attained. Failure to adequately structure the behaviors in a manner that takes into consideration both process and content creates a condition in which the teacher cannot be sure that even if the specific behaviors are achieved they will lead to the terminal goal.

2. Suggestion of appropriate learning experiences. Does it make the use of learning research possible?

   Because the behavioral outcomes contained in the objectives are not classified in a manner consistent with categories of learning research the teacher has no way of relating research findings to the behaviors.

3. Does placing the objective in the "Model" make it possible for the teacher to formulate and test hypotheses regarding the effectiveness of different learning experiences for attaining the objective?

   The objectives when placed in the GMI appear to occasionally create the conditions necessary for testing hypotheses regarding the specific behaviors contained within the objectives. Whether they do or not depends on how specific the behaviors are. They do not, however, perform the important function of allowing the teacher to test hypotheses regarding the relationship of the specific behaviors to the desired terminal outcomes.

4. Does placing the objective in the "Model" make it possible for the teacher to produce findings which can be generalized to facilitate the attainment of the same or similar objectives with different individuals and content?

   If the objectives are not categorized in some scientifically useful manner there is no way to generalize the results. Other teachers viewing the outcomes of the research can only infer that the particular learning experience was or was not effective for attaining the specific objective.

   Unless the finding can be related to a similar group of learning outcomes generalization across individuals and content is not possible.

5. Does the statement of the objective facilitate the diagnosis and remediation of learning difficulties encountered by the students?

   If students miss the objective there is no way to diagnos or remediate learning difficulty. The problem become increasingly

more difficult as the complexity of the "specific behavior" increases. Diagnosis and remediation depends upon 1) a simple to complex ordering of content and processes and 2) being able to relate the required student behaviors to learning categories that have established scientific utility.

Behavioral Objectives in which Student Behaviors Correspond to Learning Outcomes

Gagne's work in which he developed a taxonomy of learning types based on 1) the conditions necessary for the learning to occur and 2) the learner capabilities acquired by the learner as a result of the learning, paved the way for an approach to constructing behavioral objectives in which the desired learner behavior can be matched up with the kind of learning that produces the behavior. Constructing behavioral objectives so that the behaviors can be classified according to the kind of learning involved allows the teacher to use the results of learning research to help them design the optimum learning conditions necessary for the attainment of the objective.

Sample Objectives:

The student will be able to recite the preamble to the Constitution.
(Verbal Association Learning)

The student will be able to match chemical elements with their symbols.
(Multiple Discriminate Learning)

The student will be able to identify NEW examples of insects.
(Concrete Concepts)

The student will be able to identify NEW examples of situations which exhibit "Manifest Destiny."
(Abstract Relational Concepts)

The student will be able to extend the law of supply and demand to predict the effect that changing the different variables will have on price.
(Rule Learning)

The student will increase the frequency with which he hands in assignments.
(Stimulus Response Learning-Affective Domain)

Contribution the Objectives Make to the Improvement of Instruction

1. Contribution the objectives make toward the attainment of the broad general goals of instruction.

The complex behaviors contained in the broad general goals of instruction are made possible as a result of the positive transfer from complex conceptual structures. Concepts and categories of knowledge are viewed as the basic unit of positive transfer. Learning a discipline is conceived to be the learning of the concepts and principles that have been discovered as well as the processes that are used by scholars in that discipline. The task of the teacher, once the broad general objectives of instruction has been established is to:

1. Determine the principles or rules that make the attainment of the broad general objectives possible. These can be both content rules and procedural rules.
2. Determine the concepts that are required for a meaningful understanding of the principles or rules.
3. Determine the criterial attributes that objects or events must have before they can be considered a member of the category. The identification of these characteristics becomes a multiple discriminate learning task.

The attainment of the broad general objectives is a function of how well the teacher structures concepts and relationships. The notion is that if the students learn the attributes necessary for admission into a category, forms the concept, combines the concept with other concepts to form principles or relationships, he will be able to use the relationships to perform the complex behaviors specified in the broad general objectives.

2. Suggestions of appropriate learning experiences. Does the use of the objectives make the use of learning research possible?

Constructing behavioral objectives so that the learner behaviors correspond with the learning outcomes being studied in learning research makes it possible for the teacher to use the results of the research in designing classroom learning experiences. As soon as the teacher identifies that matching chemical symbols with the names of the elements involves

multiple discrimination learning or that identifying new examples of insects involves the learning of concrete concepts, etc., they are in a position to use research on that kind of learning to aid in the design of appropriate learning experiences.

The advantage of constructing behavioral based upon learning categories with established scientific utility is that it is not necessary that the teacher start from scratch in designing learning experiences everytime they encounter a new objective. As soon as the behavior in the objective is classified, the teacher already knows a good deal about the conditions necessary for the attainment of the objective.

3. Does placing the objective in the "Model" make it possible for the teacher to formulate and test hypotheses regarding the effectiveness of different learning experiences for attaining the objective?

   Placing objectives of this kind in the GMI makes it possible for teachers to add to available knowledge regarding the conditions necessary for attaining the objectives. The amount of knowledge available regarding the optimum conditions necessary for attaining the different kinds of learning outcomes decreases as the level of the learning increases. New relatively homogeneous ways of categorizing higher level tasks need to be developed. For example, ways of classifying abstract relational concepts as well as a taxonomy of inquiry processes might be developed. Teacher research could be very helpful in accumulating knowledge about the learning conditions necessary for attaining the related behaviors. A prime requirement would seem to be that the categories be relatively homogeneous in terms of content and process.

4. Does placing the objective in the "Model" make it possible for the teacher to produce findings which can be generalized to facilitate the attainment of the same or similar objectives with different individuals and content?

   The answer to this question would seem to depend upon the homogeniety of the learning categories. There is not much difficulty in generalizing from learning research on such categories as motor chaining, verbal association, multiple discrimination and concrete concepts, however, categories concerned with abstractions, rules or relationships and inquiry are so heterogenious in terms of content and behaviors that generalizing across individuals and content areas is difficult.

5. Does the statement of the objective facilitate the diagnosis and remediation of learning difficulties encountered by students?

The answer to the above appears to be "yes" if the behavioral objectives are based on a valid hierarchical structuring of content and process. Arranging objectives bases on a system of learning outcomes makes possible the development of diagnostic measurement which parallels the structure, and enables the teacher to locate the position of individuals on the structure. Remediation is made possible because of the direct relationship between learning research and the behaviors.

Conclusion

Behavioral objectives are a necessary part of the conditions for the improvement of instruction. However, by themselves they are not sufficient for the improvement of instruction. Before educational objectives can make their potential contribution to the improvement of instruction educators must:

1. Recognize that the improvement of instruction must be the more efficient attainment of the broad general goals of instruction, and not just the more efficient attainment of isolated behaviors.

2. Recognize that the attainment of the broad general goals of instruction involves the concept of "Positive Transfer," and find ways of relating subject matter content to student behaviors involving positive transfer.

3. Develop a new taxonomy of behavioral objectives consisting of relatively homogeneous categories with demonstrated scientific utility. It is suggested that a taxonomy of concepts be developed. The "concept" is suggested as the basic unit of the taxonomy because in addition to being the basic unit of positive transfer it is also the fundamental point of contact between language, logic and learning.

4. Acknowledge that the attainment of the broad general goals of instruction requires the learning of complex structures of concepts and relationships.

5. Empirically validate the additive effect of learning the structure by developing evaluation procedures which make it possible for the teacher to assess both the attainment of the broad general goals of instruction and the relationship of the attainment of the specific behaviors to the broad general goals.

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